

CLAIMS

(1) A wire-winding apparatus for continuously winding a rectangular cross section wire member having a rectangular cross section on a bobbin or a bobbin-less winding jig, the apparatus comprising:

5 a drive part for holding and rotating the bobbin or the bobbin-less winding jig; and

10 a guide member for guiding at least one side surface of the rectangular cross section wire member,

wherein winding is performed while the guide member regulating a winding position of the rectangular cross section wire member such that a side surface of the rectangular cross section wire member already wound on an outer periphery 15 of a wound portion of the bobbin or the bobbin-less winding jig closely adheres to a side surface of the rectangular cross section wire member just to be wound.

(2) The wire-winding apparatus according to Claim 1, 20 wherein the guide member relatively moves in an axial direction of the bobbin or the bobbin-less winding jig in accordance with the rotation of the bobbin or the bobbin-less winding jig.

25 (3) The wire-winding apparatus according to Claim 1 or Claim 2, wherein the bobbin or the bobbin-less winding jig has a flange portion at least at one end of the wound portion,

and the guide member suspends regulating the rectangular cross section wire member when the rectangular cross section wire member wound on the outer periphery of the wound portion of the bobbin or the bobbin-less winding jig comes close 5 to the flange portion.

(4) The wire-winding apparatus according to any one of Claims 1 to 3, wherein the rectangular cross section wire member is wound in a plurality of tiers on the outer periphery 10 of the wound portion of the bobbin or the bobbin-less winding jig, a side surface of the rectangular cross section wire member wound while being guided by the guide member as a lower tier near the axis center of the bobbin or the bobbin-less winding jig and a side surface of the rectangular cross section 15 wire member wound while being guided by the guide member as an upper tier on an outer periphery of the lower tier are opposed to each other in an axial direction of the bobbin or the bobbin-less winding jig.

20 (5) The wire-winding apparatus according to Claim 4, wherein the guide member comprises: a first guide bar for guiding the rectangular cross section wire member when winding the lower tier; and a second guide bar for guiding the rectangular cross section wire member when winding the 25 upper tier.

(6) The wire-winding apparatus according to any one of

Claims 1 to 4, wherein the guide member is movable between a guide position for guiding a side surface of the rectangular cross section wire member to be wound on the bobbin or the bobbin-less winding jig and a retreat position outside of 5 the guide position in a radial direction, and

the guide member moves from the guide position to the retreat position before a winding direction of the wire changes on the bobbin or the bobbin-less winding jig.

10 (7) The wire-winding apparatus according to Claim 6, wherein the guide member is formed by a flexible plate member having a guide part contacting the rectangular cross section wire member and a support part supporting the guide part in a cantilever state,

15 and the guide member bends by receiving a force from the rectangular cross section wire member being guided at the guide position.

(8) The wire-winding apparatus according to Claim 6, 20 wherein the guide member is formed by a flexible plate member having a guide part contacting the rectangular cross section wire member and a support part supporting the guide part in a cantilever state,

and a support angle of the support part changes at 25 the time when the rectangular cross section wire member is wound in one direction and at the time when the rectangular cross section wire member is wound in the other direction.

(9) The wire-winding apparatus according to Claim 7 or  
Claim 8, wherein the rectangular cross section wire member  
is guided by one of the surfaces of the guide when the  
5 rectangular cross section wire member is wound in one  
direction, and the rectangular cross section wire member  
is guided by the other of the surfaces of the guide member  
when the rectangular cross section wire member is wound in  
the other direction.

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(10) The wire-winding apparatus according to any one of  
Claims 6 to 9, wherein the guide member moves in an axial  
direction in accordance with the rotation of the bobbin or  
the bobbin-less winding jig.

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(11) The wire-winding apparatus according to any one of  
Claims 6 to 9, wherein the bobbin or the bobbin-less winding  
jig moves in an axial direction in synchronism with the  
rotation thereof with respect to the guide member.

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(12) The wire-winding apparatus according to any one of  
Claims 6 to 11, wherein the guide member moves in a radial  
direction in accordance with an outside diameter of the  
rectangular cross section wire member wound on the bobbin  
25 or the bobbin-less winding jig.

(13) The wire-winding apparatus according to any one of

Claims 6 to 12, wherein the bobbin has a terminal and when  
the rectangular cross section wire member whose one end  
vicinity is bound to the terminal is bound on an outer periphery  
surface of the bobbin, the guide member presses the  
5 rectangular cross section wire member to a flange of the  
bobbin.

(14) A wire-winding apparatus for continuously winding  
a rectangular cross section wire member on a bobbin or a  
10 bobbin-less winding jig, the apparatus comprising:

    a rotational drive part for holding and rotating the  
    bobbin or the bobbin-less winding jig; and  
    an axial-direction drive part for independently moving  
    at least two driven members in an axial direction of the  
15     bobbin or the bobbin-less winding jig in synchronism with  
    the rotation of the drive part.

(15) The wire-winding apparatus according to Claim 14,  
wherein the driven members are guide members for guiding  
20 the rectangular cross section wire member to wind on an outer  
periphery of the wound portion of the bobbin or the bobbin-less  
winding jig.

(16) The wire-winding apparatus according to Claim 15,  
25 further comprising a holding mechanism for holding and  
cutting the rectangular cross section wire member, and the  
guide member moves integrally with the holding mechanism.

(17) A wire-winding apparatus comprising:

first holding means for holding a wire source side of a rectangular cross section wire member;

5 second holding means for holding an end side of the rectangular cross section wire member;

a rotational drive part for holding and rotating the bobbin or the bobbin-less winding jig; and

10 drive means for moving the first holding means and the second holding means, and the bobbin or the bobbin-less winding jig relatively with each other while maintaining the direction of the rectangular cross section wire member of the wire source side held by the first holding means and the direction of the rectangular cross section wire member 15 of the end side held by the second holding means.

(18) The wire-winding apparatus according to Claim 17, wherein the second holding means performs a binding operation of the rectangular cross section wire member after the first holding means and the second holding means, and the bobbin or the bobbin-less winding jig are relatively moved and at least one side surface of the rectangular cross section wire member is contacted with the bobbin or the bobbin-less winding 20 jig.

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(19) The wire-winding apparatus according to Claim 17 or Claim 18, wherein the drive means independently moves the

**first holding means and the second holding means.**

(20) **The wire-winding apparatus according to any one of Claims 17 to 19, wherein the second holding means is a**  
5 **cut-and-hold mechanism.**

(21) **The wire-winding apparatus according to any one of Claims 17 to 20, wherein the first holding means includes a pulley.**